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Evidence of exchange interaction of localized carriers and transition metals in diluted II-VI nanostructures: ODMR study

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Abstract

© 2016 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.Optically detected magnetic resonance study of (CdMn)Te/(CdMg)Te quantum wells allowed to reveal the formation of exchange-coupled complexes consisting of Mn ions and localized holes in quantum wells with excess hole concentration and the directional electron tunneling towards wider wells in multiple quantum well structures. The existence of a distribution of Mn-hole complexes that differ in a number of Mn ions interacting with a localized hole is justified. In colloidal cobalt doped ZnO nanocrystals, several nm in diameter, the interaction between the magnetic ions and the shallow donor electron in the confined system of ZnO quantum dots has been revealed. Direct evidence of interaction of Co ions with the interstitial Li shallow donor in the ZnO nanocrystal core and hyperfine coupling with 1H in the quantum dot shell have been demonstrated.

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Keywords

Colloidal nanocrystals, Optically detected magnetic resonance, Quantum wells, Transition metals, ZnO